

# Large Scale Demonstration and Deployment Project (LSDDP)

## Fact Sheet

### Fernald Plant 1 D&D

In Partnership With The Office of Science and Technology (EM-50)

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#### Introduction

Fernald, originally called the Feed Materials Production Center, produced "feed" materials in the form of purified uranium metal for use by other DOE sites in the production of nuclear material. The facility was built by the Atomic Energy Commission (a predecessor to the DOE). After evaluating several sites, the government selected a 1,050-acre site situated just north of the small farming community of Fernald, Ohio, located approximately 18 miles northwest of downtown Cincinnati. Construction began in 1951 in the midst of the Cold War era, and production operations began in 1952.



#### Objective

The Fernald Plant 1 D&D LSDDP project was one of the first three LSDDP projects initiated by the Deactivation and Decommissioning Focus Area (DDFA). Main objectives of the project were to introduce existing commercial technologies to the site and the DOE complex that can reduce the costs, risks and improved worker safety. The

project's Integrating Contractor Team included Fluor Daniel Fernald, B&W NESI, Foster Wheeler, Jacobs Engineering, Halibuton NUS, and Florida International University.

#### Technical Needs

Five categories of technologies were considered during the Fernald LSDDP:

- Dismantlement
- Personal Protective Equipment
- Decontamination
- Scabbling
- Characterization

#### Technologies Demonstrated

**Steam Vacuum Cleaning (Tech ID 1780):** The Kelly Decontamination system uses the kinetic energy of superheated pressurized water to dislodge surface contaminants from the debris. The waste stream passes through a liquid separator, a demister and a high efficiency particulate air (HEPA) filter that remove contaminants and discharge clean air to the atmosphere.

**Soft Media Blast Cleaning (Tech ID 1899):** The Soft Media Blast Technology (SMBT) propels a soft blast media against the surface to be decontaminated, using mechanical abrasion and contaminant absorption to clean the surface. Compressed air is used to propel soft blast media, which is ejected through a hose and nozzle arrangement.

**VecLoader HEPA Vacuum Insulation Removal (Tech ID 1784):** The VecLoader® HEPA VAC II™ insulation removal system is a powerful vacuum capable of suctioning 1,700 cubic feet of air per minute at a vacuum of 15 inches of mercury.

**Oxy-Gasoline Torch (Tech ID 1847):** The oxy-gasoline torch developed by Petrogen International, Ltd., is a fully mature and



commercially available metal-cutting torch system. The oxy-gasoline torch is a viable alternative to the oxy-acetylene torch for the dismantlement and size-reduction of metallic D&D debris.

**Field Raman Spectroscopy (Tech ID 873):** The Field-Portable Raman Spectroscopy instrument works by exposing surfaces to laser light and detecting light that is inelastically scattered back. This inelastic scattering is known as the Raman effect. The varying wavelengths of the inelastically scattered light are characteristic for each compound. The intensity of the scattered light provides a means for quantifying contaminants.

**Laser Induced Fluorescence (Tech ID 1999):** The laser induced fluorescence (LIF) system can be operated to survey large areas of uranium oxide molecules quickly, or used to survey discrete two foot by two foot areas of uranium oxide molecules at a time. Unlike physical swipes, which must be collected from the actual surface being surveyed, the LIF instrument can be operated up to 10 meters away from the surface being studied.

**Piping Inspection (Tech ID 1811):** This demonstration set out to determine the feasibility of using a camera and other equipment to visually inspect the piping and verify the presence or absence of process residue.

**Low Density Cellular Concrete Void Filling (Tech ID 1846):** The concept behind void filling is that vessel void spaces would be filled with a pumpable material that once solidified, would be capable of withstanding the compressive load resulting from overburden. Thus, should the vessel's wall/shell degrade and fail over time, the

solid void filling media would prevent subsidence of a cap.

**Urethane Foam Void Filling (Tech ID 1816):** Urethane void filling uses expanded polyurethane foam, a fully developed and commercially available technology. Mixing two liquid chemicals, polymeric diphenylmethane diisocyanate (MDI) and polyol blend produces the polyurethane foam. The urethane foam void-filling technology is a practicable and effective means of eliminating void spaces from vessels that are to be disposed of intact.

**Personal Ice Cooling System (Tech ID 1898):** The Personal Ice Cooling System (PICS) is a self-contained core body temperature control system that uses ice (made with tap water) as a coolant and circulates cool water through tubing that is incorporated into a durable and comfortable, full-body garment suit similar to long underwear.

**Centrifugal Shot Blasting (Tech ID 1851):** The Centrifugal Shot Blast (CSB) system propels hardened steel shot at high velocities (220 feet per second) onto concrete floor surfaces. After the shot is propelled onto the floor, the resulting impact causes the cement to fracture into small pieces, which are then captured by an integrated dust collection system.

**Mobile Work Platform (Tech ID 2243):** The Mobile Work Platform is radio remote controlled machine developed especially for the removal of pipe/conduit. The MWP can grab, support, crimp, shear then lower in a controlled manner schedule 40, carbon steel pipe. The MWP has the capability to cut pipe into sections up to 30 feet above the ground.

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<http://www.netl.doe.gov/dd>

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